their more limited power of obtaining nitrogen, could not appropriate from the soil. They assumed that it was the nitrogen rather than the mineral constituents of the fungi to which the manuring action was mainly to be attributed, and in this they were right; but the theory has required some correction nevertheless, inasmuch as they have since proved the source of nitrogen in the fungi to be the soil, not the atmosphere.

As doubts were entertained at first on this point, direct experiments were tried at Rothamsted, and in 1874 samples of soil were taken within a fairy ring, immediately upon it, and outside, and these yielded on analysis the lowest percentage of nitrogen in the soil within the ring, a higher percentage under the ring, and a higher still outside it. The soil therefore had lost nitrogen by the growth of the fungi, and the obvious conclusion was that the fungi possess a greater power than the grasses of abstracting nitrogen from the soil.

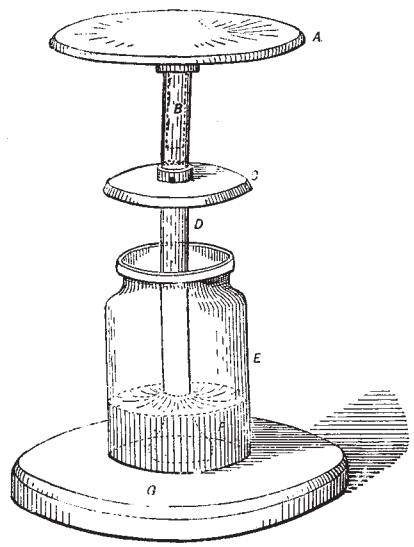
The analyses of the various species of fairy-ring fungi do not greatly differ. Two species occurring at Rothamsted—*Agaricus prunulus* and *Marasmius orcadum*—contain nitrogenous compounds to the amount of one-third of their dry substance, the ash being rich in potash and phosphoric acid. Their occurrence on pastures, like that of the common mushroom, is probably due to the manuring of the ground by animals and their continuance and growth depend on certain conditions of soil and season. They are rarely developed on rich soils, or on those which are highly manured, or in seasons favourable to the general herbage of the turf; and when they do appear under these conditions they will probably not be reproduced, or only in patches. The recent wet seasons have dispersed fairy rings in situations where they have usually proved persistent. They prevail wherever the growth of the grasses is inferior, especially on the poor downs of the chalk districts, and on poor sandy soils where the natural herbage is wanting in vigour.

The history of fairy rings, as it has now been written at Rothamsted, will attract close attention from all who are interested in the nutrition of plants, including the student of agriculture, and all, in fact, who are specially concerned in the question of the food supply. It was not previously known that any kind of plant could feed directly on the organic nitrogen of the soil itself. It was recognised that the root-development of plants differed, and that the greater extension of their roots enabled some plants to secure a larger proportion of the constituents of the soil than others. But here is a race of plants possessing quite unsuspected powers of assimilation! Instead of rising from the ashes of the phœnix they feed upon its undecayed body, that is, upon the organic nitrogen of the soil. The Leguminosæ, for example, such as beans and clover, are known to assimilate more nitrogen from a given soil than the Gramineæ, such as wheat and barley, and this has been attributed to absorption by their leaves, or to the superior development of their roots. Another alternative is now suggested, and possibly a new departure may be taken in the science of agriculture, as the result of the recent discoveries in connection with fairy rings. HENRY EVERSHED

A CHEAP INSULATING SUPPORT

INSULATING-SUPPORTS are so indispensable in the work of an electric laboratory that several forms have come into extensive use. The plan devised by Sir W. Thomson for securing high insulation by surrounding a glass stem with concentrated sulphuric acid to absorb the moisture which otherwise would condense from the air and form a conducting film over the surface of the glass is remarkably efficient, and has many advantages. Modifications of this form of insulator have been largely used by Prof. Clifton, F.R.S., in the Clarendon Laboratory, and by Profs. Ayrton and Perry in the laboratories of the Technical College at Finsbury. Another modification due to M. Mascart, was described in NATURE, vol. xviii. p. 44; and this pattern has come into extensive use under the name of the *support isolant Mascart*. Though excellent in every way it is very expensive, as its manufacture necessitates a special piece of glass-blowing. The central support of glass is solidly fused into the bottom of a glass vessel with a very narrow neck into which acid is poured through a tubulure at the side.

The insulating support which I have recently described before the Physical Society of London is a much simpler affair, and can be made very quickly and cheaply from the materials at hand in every laboratory. The figure shows the form of the support. A wide-mouthed glass bottle, E, about 10 cm. high, and from 5 to 6 cm. diameter, is selected. A piece of stout glass tubing about 20 cm. long is then taken. One end is closed in the blowpipe flame, and blown into a thick bulb; and while yet hot the bulb is flattened, so as to form a foot for the stem. The flattened bulb should be as large as is compatible with its insertion into the mouth of the bottle. To hold it in its



place some paraffin wax is melted in the bottle—from 50 to 70 grm. is quite sufficient—and when it has cooled so as nearly to have become solid the stem, previously warmed, is inserted. When cool, the paraffin holds the stem firmly in its place. To keep out the dust a disk cut out of sheet guttapercha is fitted on as a lid. If dipped into hot water for a minute it can be moulded to the required form. It fits loose-tight upon the stem, as shown at C, and when the stand is not in use is slid down over the mouth of the bottle. A brass disk, A, having a short brass stem, B, below it, slips into the upper open end of the tube, and forms the top of the stand. It is also found convenient to make from rods of glass other supports, shaped at the top in the form of hooks, which can be slipped down into the central tube. These are very useful for holding up wires that pass over the experimenting table and require to be well insulated. The bottle is let into a wooden foot, G. In cases where very perfect insulation is required I have poured a little strong sulphuric acid into the bottle above the paraffin. In practice, however, the insulation of the paraffin is amply sufficient for most purposes, provided dust is properly excluded.

SILVANUS P. THOMPSON

JOHN HUTTON BALFOUR

IN Prof. Balfour, whose death we announced in our last issue (p. 365), has passed away another of that group of eminent teachers, including Goodsir, Syme,

Simpson, Christison, &c., which maintained the reputation and added lustre to the fame and prestige of the Medical School in our great northern University during the middle decades of this century; one, too, of that band of working British botanists of the first half of the century which counted amongst its members the Hookers, Munby, Carmichael, Greville, Walker Arnott, Babington, Parnell, Prior, the Macnabs, &c, the majority of whom have now left us; and where are their successors? By his death a figure—in later years picturesque with grey locks and patriarchal beard—familiar all over Scotland, and where scientific men do congregate, has been removed. Few men were more universally esteemed and popular, and few quit their sphere of active and busy life leaving behind them more pleasant reminiscences than he whose decease we have recorded. Compelled by failing health to retire about five years ago from public life, his powers since then gradually weakened, until on the 11th inst. he quietly breathed his last.

John Hutton Balfour was born in Edinburgh on September 15, 1808. Related, as his name indicates, to James Hutton, the famous author of "The Theory of the Earth," he possessed much of the enthusiasm and fire which characterised his ancestor. His early education was completed at the High School of Edinburgh, then at the zenith of its reputation, under Pillans and Carson, and he subsequently studied in the Universities of Edinburgh and St. Andrews, in the former of which he graduated in Arts and Medicine. His first intention appears to have been to enter the Church, and to this aim his studies were directed; but he afterwards abandoned this purpose and commenced to practise medicine in Edinburgh, having spent some preparatory time in Continental schools, and having become a Fellow of the Royal College of Surgeons of Edinburgh. During his early years he was devoted to botany, and his taste received a great stimulus by the teaching and example of Graham, then Professor of Botany in the University of Edinburgh. Whilst engaged in the active work of his profession, he found time to foster his bent and love for nature, and gathered around him many of those who, like himself, were keen students of natural science, and thus was formed the nucleus of the Botanical Society of Edinburgh, of which he was, in 1836, the founder—a society which has done much to promote the study of botany in Scotland, and in which, throughout his whole life, he was a guiding spirit. In 1840 Balfour found time amidst his medical duties to commence lecturing on botany in Edinburgh, and his ability as a lecturer was at once proved by the large numbers attracted to his classes. But it was not until 1842, when he was appointed to the Chair of Botany in the University of Glasgow, vacated by the translation of Sir William Hooker to Kew, that he was able to give up medicine, and devote himself solely to botany. After four years in Glasgow, the death of Prof. Graham made an opening in the East of Scotland, and Balfour was elected Professor of Botany in the University of Edinburgh, shortly thereafter obtaining the appointments of Regius Keeper of the Royal Botanic Garden and Queen's Botanist for Scotland. Subsequently he undertook the duties of Dean of the Medical Faculty in the University, and his energy on behalf of the Royal Society of Edinburgh led to his appointment as Secretary. From all these positions he retired in 1879, when a fitting tribute to the value of his services was paid by the presentation of his portrait, and he was then elected Assessor in the University Court for the General Council, and each of the three Universities with which he had been connected conferred on him the degree of LL.D. For many years he was an F.R.S., and also a member of a vast number of British and foreign scientific societies.

As a botanical investigator Balfour was a systematist, belonging to that school which is now, by a species of reaction, often held in contempt by those within whose reach the modern developments of physics and chemistry have placed methods of morphological and physiological research denied their predecessors. He had an acute perception of resemblances and a keen eye for a species. But it is not upon his original investigations that Balfour's reputation rests; his work of that character was not extensive, for the time which might have been devoted to it was fully occupied by his official duties as Dean of the Medical Faculty and Secretary of the Royal Society, and he was one of those who sacrificed scientific laurels for the good of the institutions he served. But as a teacher his fame was world-wide, and as a great teacher he will be remembered. He had in a remarkable degree the power of lucid exposition, and the inestimable qualification of infusing in his pupils the enthusiasm which possessed himself. Painstaking and conscientious in his work, no trouble was too great for him if it could contribute to the better comprehension by his students of the subject taught, and the wealth of illustration and the earnestness of manner which clothed his lectures impressed all who heard him. Though the natural cast of his own mind made taxonomy his favourite branch of botany, yet in his teaching, especially in his earlier years, this was given no undue prominence; his success, indeed, was in great part due to the way in which all branches of the science were handled, and he had the credit of being the first to introduce in Edinburgh classes for practical instruction in the use of the microscope. His text-books reflect the character of his teaching, and "if," as a critic remarked on their first appearance, "we recall the dry and dictionary-like manuals to which students were forced to have recourse in our young days—as inviting as so many pages of Johnson's Dictionary—we can but envy their successors." In later years his books and he himself fell behind—and who does not?—in the rapid march of science; but any one examining his books cannot fail to recognise how thoroughly they represent the state of science at their date of publication, and to appreciate the industry and the skill with which the author seems to have exhausted every source of information.

Another feature of Balfour's teaching was the "excursion." Amongst the 8000 students whom it was his pride to have passed through his classes will be many to whom the announcement of his death will recall pleasant recollections of these outings on hill and in glen; how, as they neared the habitat of some rare Alpine herb, the wiry and energetic Professor—"Woody Fibre" as they called him—would outstrip all in his eagerness to secure it; or how, toiling up some long barren slope, his constant flow of jokes and puns would enliven and rouse their flagging spirits. In these rambles, to which many will look back as not only healthful and recreative, but as giving them their first lessons in accurate observation of nature, Balfour visited almost every part of Scotland, ascended every important peak, and gathered every rarity in the flora. No one knew Scotland and its plants better. In this way Balfour became associated with his students in a way no other Professor did, and his position as Dean of the Medical Faculty brought him still more in contact with them. The Rhadamanthus of the examination-hall he enjoyed a unique popularity, and the esteem with which old pupils regarded him may be traced to the intimate relationships thus established, to the way he identified himself with and interested himself in them and showed himself always anxious to merge the professor in the friend. In all he did Balfour was methodical, and his powers of organisation and administration found exercise in the management of the Royal Botanic Gardens, which, under his direction and with the Macnabs—father and son—as curators, was greatly increased in extent, provided with a magnificent palm-house and other plant-houses, as well as with a botanical museum and improved teaching accommodation, and made one of the finest in the country. The latest addition to the garden—the

arboretum—accomplished just before he retired from public life, was part of a scheme (perhaps chimerical) he encouraged with the view of establishing a School of Forestry in Edinburgh—a scheme now receiving some attention in Scotland.

Ready and rapid with his pen, Balfour's contributions to botanical and other literature are very numerous. Besides contributing to several Encyclopædias, he was for many years one of the editors of the *Annals of Natural History* and of the *Edinburgh New Philosophical Journal*. Of independent works, his text-books, to which we have already alluded, were very popular in their day, and are now valuable for reference, and he published works on Botany and Religion, Plants of the Bible, &c.

We should fail to give an adequate idea of the veteran Professor were we not to allude to that which gave a character to all he did—his religion. To him all nature was a symbol. He was one of that band of which Faraday, Clerk Maxwell, Greville, Wm. Allen Miller, and others were in the van, who "recognised the harmony between the word and the works of God," and who saw "in the objects of nature around indubitable evidences of a great designing mind."

By those who knew him—and his was a wide circle of friends—he will be remembered as a genial companion with the best attributes of humanity, and his name will always remain inseparably linked with the progress of botany in Scotland during this century, and as that of one of the eminent teachers in the University and city to which he belonged.

CAPTAIN HOFFMEYER

IN the early death of Niels Hoffmeyer, which occurred at Copenhagen on the 16th inst., modern meteorology has lost one of its most diligent and successful students, and one whose place it will be hard to fill.

Like more than one of our own physicists, Hoffmeyer was an artillery officer, and had attained the rank of captain in the service. At the close of the Prussian war he had fallen into bad health, and accordingly, on the reduction of the Danish army which then ensued, his name was placed on the retired list, and he was for a time unoccupied.

The Danish Meteorological Institute was organised in 1872, and Hoffmeyer was nominated its first director. There could scarcely have been a more fortunate appointment, for Hoffmeyer was gifted not only with unusual energy, but also with a very pleasant manner, so that he made friends for the new office and for its work wherever he went. He will best be known by his Atlas. He undertook to prepare daily weather-maps of the Atlantic—in great measure at his own expense—and he actually published them for a period of three and a quarter years, from September, 1873, to November, 1876. It is only a few months ago that he announced his intention to resume the work in combination with Dr. Neumayer, of the Deutsche Seewarte at Hamburg.

The most important results which Hoffmeyer had deduced from his own maps were contained in his pamphlet, "Étude sur les Tempêtes de l'Atlantique Septentrional, et Projet d'un Service Télégraphique International Relatif à cet Océan," Copenhagen, 1880; and up to the very last he never ceased to use his utmost efforts for the establishment of a meteorological telegraphic service with America, *viâ* the Faroes and Iceland.

While Hoffmeyer's chief work was in the domain of synoptic meteorology, he by no means disregarded climatology, and the service which the Danish Office has rendered to that science by the maintenance of stations in Iceland and Greenland has been very material.

When Capt. Hoffmeyer was in London last summer as Danish Commissioner to the Fisheries Exhibition, he was complaining of great weakness of the heart. During December he was laid by for some time, but he had somewhat recovered, when he was seized last week with rheumatic fever, to which he soon fell a victim. He leaves a widow, but no children. He was an Honorary Member of the Royal Meteorological Society (London). He had been one of the secretaries of the Meteorological Congress at Rome, 1879, and of the Conference on Maritime Meteorology in London, 1874, but his chief official service of this nature was as Secretary to the International Polar Commission, where his loss, coming after that of Weyprecht, will be severely felt.

NOTES

THE Council of the Royal Society of Edinburgh has awarded the Keith Prize for the biennial period 1881–83 to Mr. Thomas Muir for his researches into the theory of determinants and continued fractions, the most recent instalment of results obtained by him being in a paper on permanent symmetric functions. Also the Macdougall-Brisbane Prize for the period 1880–82 to Prof. James Geikie for his contributions to the geology of the north-west of Europe, including his paper on the geology of the Faröes, published in the *Transactions* of the Society, 1880–81. And the Neill Prize for the triennial period 1880–83 to Prof. Herdman for his papers in the *Proceedings* and *Transactions* on the Tunicata.

WE learn from the *Standard* that the Royal Astronomical Society has awarded Mr. Ainslie Common its gold medal for his photographs of celestial bodies. This high award has, it is believed, been mainly bestowed on account of the magnificent photograph he has succeeded in taking of the great nebula in Orion, of which we gave an illustration in a recent number.

WE regret to learn of the death of M. T. du Moncel, editor of *La Lumière Électrique*, and author of numerous works in theoretical and practical electricity.

THE needs of the higher education of women in London are gradually being met in the manner that has been found so satisfactory at Oxford and Cambridge, where women students have long enjoyed the advantages of collegiate life. On Monday, February 11, there was a gathering of many of the most influential friends of the movement to inspect an important extension of the College Hall of Residence established at Byng Place, Gordon Square, in October 1882. The success which attended the first development of the scheme, and the growing demand on the part of students for admission, has encouraged the committee to provide additional accommodation by adapting the adjoining house, No. 2, Byng Place. With the new extension they look forward to a yearly surplus instead of a deficit. With the power of accommodating thirteen extra students the receipts would be increased by 876*l.* for the short session, and there would not be a proportionate increase in the expenditure. The advantage of holding the two houses is therefore evident. The second house was opened at the commencement of the current term, and there are now seventeen students in residence. Of this number two are pursuing the course of instruction provided at University College for the B.A. degree, two that for the matriculation examination of the London University, and another, a foreign lady, is a student of English literature at the same college; another student is preparing for the examination of the Pharmaceutical Society. Four ladies are students of the London School of Medicine for Women, and preparing for the M.B. degree (Lond.), and the remainder are studying art at the Slade School and elsewhere. The first student of the Hall who went up for the examination for the B.A. degree passed successfully last October, and has now an appointment as teacher at a school in York. The expenses for board and residence vary, according to the size and position of the room occupied, from 51 to 75 guineas for the